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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/666,953	09/17/2003	Qinfang Sun	ATHEP124	7068

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EXAMINER	
HOM, SHICK C	

ART UNIT	PAPER NUMBER
2616	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/666,953	SUN ET AL.	
	Examiner	Art Unit	
	Shick C. Hom	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 August 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-11,13-18,21,22 and 25-39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1,2,4-6,21 and 25* is/are allowed.

6)☒ Claim(s) *7-11,14-18,22 and 26-39* is/are rejected.

7)☒ Claim(s) *13* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 August 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-2, 4-11, 13-18, 21-22, and 25-39 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

2. Claims 2, 4-6, 8-11, 13-18, and 28-37 are objected to because of the following informalities: In claims 2, 4-6 line 1, the words "A method of estimating the characteristics of a wireless channel" seem to refer back to the "method of estimating the characteristics of a wireless channel" recited in claim 1 line 1. If this is true, it is suggested changing "A method of estimating the characteristics of a wireless channel" to ---The method of estimating the characteristics of the wireless channel---. Likewise, in claims 8-11, 13-18, and 28-37 change "A method of classifying a packet sent over a wireless channel" to ---The method of classifying the packet sent over the wireless channel---. In claims 8-10, 28-30 line 2 delete "a phase transition" and insert ---the phase transition---. Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. Claims 1-2, 4-6, and 21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1 line 10 and claims 21, 25 line 11, which recite "computing the self correlation between the cross correlation values of two training symbols" is not clearly understood because page 12 lines 9-14 seems to suggest computing the self correlation of successive cross correlations for the purpose of producing the composite symbol.

Claims 2, 4-6 are rejected under 35 U.S.C. 112, second paragraph because they depend from rejected claim 1.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 7-10, 14-17, 22, 26-30, 32-36, and 38-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gardner et al. (6,707,856) in view of Dolle et al. (6,674,817).

Regarding claims 7, 22, 26, 27, 32, and 38-39:

Gardner et al. disclose a method of characterizing a packet sent over a wireless channel comprising:

receiving a plurality of training symbols sent for the purpose of facilitating channel estimation; detecting a phase transition between at least two of the training symbols (col. 2

lines 38-51 recite receiving the first and second set of training symbols, the decoder that obtains the phase differences between symbols of the second and first set of training symbols, and the control processor that determines the communication information based on the phase differences); and

characterizing the packet based on the detected phase transition; wherein the characterization determines a data rate for a portion of the packet (col. 4 lines 39-49 recite that the parameters encoded by the training symbols include the convolution code rate).

Gardner et al. disclose all the subject matter of the claimed invention with the exception of wherein characterizing a packet includes classifying the packet and the classification being the data rate of the portion of the packet as in claims 7, 22, 26, 27, and 38.

Dolle et al. from the same or similar fields of endeavor teach that it is known to provide wherein characterizing a packet includes classifying the packet and the classification being the data rate of the portion of the packet (col. 4 lines 5-8 recite distinguishing different types of data bursts based on the training sequences).

Thus, it would have been obvious to the person having ordinary skill in the art at the time the invention was made to provide wherein characterizing a packet includes classifying the packet and the classification being the data rate of the portion of the packet as taught by Dolle et al. in the communications system and method of Gardner et al. The motivation for providing wherein characterizing a packet includes classifying the packet and the classification being the data rate as taught by Dolle et al. in the communication system and method of Gardner et al. being that it provides the desirable added feature of classifying incoming packets to provide quality of service and to provide more efficiency for the system by avoiding the waste of network resources.

Regarding claims 8, 28:

Gardner et al. show all the elements except specifically detecting a phase transition between at least two of the training symbols that includes calculating a phase difference between at least two of training symbols and comparing the calculated phase difference to a threshold.

Dolle et al. show detecting a phase transition between at least two of the training symbols that includes calculating a

phase difference between at least two of training symbols and comparing the calculated phase difference to a threshold comprising the recognizing means of the communication device that includes the means for detecting the phase of the auto-correlation result of the training sequence (plurality of symbols; Fig. 3). In this case, the recognizing means can further comprise means for comparing the detected phase (calculated phase difference) with a predetermined phase threshold to recognize the type of the received data burst (Col. 4, lines 41-47).

Therefore, it would have been obvious to on of ordinary skilled in the art at the time of invention to modify the method of Gardner et al. to calculate an accurate value of the frequency offset of the transmitted data bursts.

Regarding claims 9, 29:

Gardner et al. show all the elements except a method of detecting a phase transition between at least two of the training symbols includes conjugate multiplying the training symbols and determining the sign of the real part of the result of the conjugate multiplying.

Dolle et al. show a method of detecting a phase transition between at least two of the training symbols includes conjugate multiplying the training symbols and determining the sign of the real part of the result of the conjugate multiplying comprising a training sequence consists of a predetermined number of repetition patterns or symbols, whereby each symbol consists of a certain number of samples. Further, in the correlation means 5, the samples (training symbols) are supplied to a delay means 8 for delaying the samples by a factor D.sub.ac and supplied to a means 9 for calculating the conjugate complex value of the data. The conjugate complex data samples output from the means 9 are multiplied with the received data samples in a multiplier 12. If e.g. the delay means 8 delays the received data by one sample, so that the conjugate complex value of each preceding sample is multiplied with the succeeding sample in the multiplier 12 (Col. 7, lines 52-57; Fig. 4).

Further, Dolle et al. show the recognizing means advantageously comprises means for detecting the sign value of the real part (sign of the real part) of the auto-correlation result (result of the conjugate multiplying) of the training sequence and means for determining the type of the received data burst on the basis of said sign value.

Therefore, it would have been obvious to on of ordinary skilled in the art at the time of invention to modify the method of Gardner et al. to detect the incoming packets as within the parameters/threshold values, thus to provide proper synchronization between the receiver and transmitter.

Regarding claims 10, 30:

Gardner et al. show all the elements except a method of detecting a phase transition between at least two of the training symbols includes computing the angle of the self correlation of the training symbols.

However, Dolle et al. show a method of detecting a phase transition between at least two of the training symbols includes computing the angle of the self correlation of the training symbols comprising the detecting means 19 can calculate the angle of the auto-correlation (self correlation) result and then calculate the phase value from the calculated angle (Col. 9, lines 52-54).

Therefore, it would have been obvious to on of ordinary skilled in the art at the time of invention to modify the method of Gardner et al. to be able to accurately synchronize the receiver with the transmitter.

Regarding claims 14, 33:

Gardner show all the elements except wherein the phase difference is caused by inverting the sign of a selected training symbol.

Dolle et al. show a method wherein the phase difference is caused by inverting the sign of a selected training symbol comprising by inverting the symbols of the second training sequence in this way, a different phase behavior (phase difference) for the first and second training sequence (symbols) can be obtained in the auto-correlation procedure performed in the recognizing means 7, so that first and second training sequences and therefore first type and second type data bursts can be distinguished from each other (Col. 7, lines 10-16). Therefore, it would have been obvious to one of ordinary skilled in the art at the time of invention to modify the method of Gardner et al. to be able to provide synchronization between the receiver and transmitter.

Regarding claims 15, 34:

Gardner et al. show all the elements except a method wherein the phase difference is caused by inverting the sign of

a selected training symbol and the classification is based on which training symbol was selected to be inverted.

Dolle et al. show a method wherein the phase difference is caused by inverting the sign of a selected training symbol and the classification is based on which training symbol was selected to be inverted comprising by inverting the symbols of the second training sequence in this way, a different phase behavior (phase difference) for the first and second training sequence (symbols) can be obtained in the auto-correlation procedure performed in the recognizing means 7, so that first and second training sequences and therefore first type and second type data bursts can be distinguished from each other (classified) (Col. 7, lines 10-16). Therefore, it would have been obvious to one of ordinary skilled in the art at the time of invention to modify the method of Gardner et al. to be able to provide synchronization between the receiver and transmitter.

Regarding claims 16, 35:

Gardner et al. show all the elements except a method wherein the result of comparing the calculated phase difference to a threshold is used as a confirmation that the packet is a valid packet.

Dolle et al. show a method wherein the result of comparing the calculated phase difference to a threshold is used as a confirmation that the packet is a valid packet comprising by inverting the symbols of the second training sequence in this way, a different phase behavior (phase difference) for the first and second training sequence (symbols) can be obtained in the auto-correlation procedure performed in the recognizing means 7, so that first and second training sequences and therefore first type and second type data bursts can be distinguished from each Other (interpreted as determining whether packets are valid or invalid) (Col. 7, lines 10-16). Therefore, it would have been obvious to one of ordinary skilled in the art at the time of invention to modify the method of Gardner et al. to be able to provide synchronization between the receiver and transmitter.

Regarding claims 17, 36:

Garner show all the elements except a method wherein the result of comparing the calculated phase difference to a threshold is used to selectively change the polarity one or more received training symbols.

Dolle et al. show a method wherein the result of comparing the calculated phase difference to a threshold is used to

selectively change the polarity one or more received training symbols comprising the recognizing means of the communication device that includes the means for detecting the phase of the auto-correlation result of the training sequence (symbols). Dolle et al. further show the recognizing means can further comprise means for comparing the detected phase (calculated phase difference) with a predetermined phase threshold to recognize the type of the received data burst (Col. 4, lines 41-47). Further, the recognizing means advantageously comprises means for detecting the sign value of the real part of the auto-correlation result of the training sequence. Thus, inverting the symbols (changing the polarity) of the second training sequence (containing plurality of symbols) in this way is done, that is by using the auto- correlation result, and further a (new) different phase behaviour (phase difference) for the first and second training sequence (symbols) can be obtained in the auto-correlation_ procedure performed in the recognizing means 7, so that first and second training sequences and therefore first type and second type data bursts can be distinguished from each other (Col. 7, lines 10-16). Therefore, it would have been obvious to one of ordinary skilled in the art at the time of invention to modify the method of Gardner et al. to be able to

provide proper synchronization between the receiver and transmitter.

9. Claims 11 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gardner et al. (6,707,856) and Dolle et al. (6,674,817) in view of Buehrer et al. (6,515,978).

Gardner et al. show all the elements except a method wherein the classification determines the number of training symbols expected.

Dolle et al. show the classification method comprising comprising recognizing means (classifying means) for recognizing the type of a received data burst on the basis of a phase value of the auto-correlation result (phase difference result) of the training sequence (containing training symbols) of said burst (includes plurality of packets) (Col. 3, lines 8-10). Further, Dolle et al. show the phase information of the auto-correlation result for the two training sequences is different so that the different types of data bursts can be distinguished (classified) (Col. 4, lines 5-8). Therefore, it would have been obvious to on of ordinary skilled in the art at the time of invention to

modify the method of Gardner et al. to classify the incoming packets to provide quality of service later on.

However, Dolle et al. do not show determining the number of training symbols expected.

Buehrer et al. show determining the number of training symbols expected comprising the number and frequency of the training symbols being determined by the SNR (signal-to-noise ratio) required in the channel estimate (Col. 9 lines 5-8).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of invention to modify the method of Gardner et al. and Dolle et al. to improve the channel estimate by increasing the number of training symbols since the effect of noise can be averaged out on each individual sample.

10. Claims 18 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gardner et al. (6,707,856) and Dolle et al. (6,674,817) in view of Arima et al. (2003/0165185).

Garner show all the elements except a method wherein the result of comparing the calculated phase difference to a threshold is used to selectively change the polarity one or more

received training symbols and wherein the calculated phase difference used to coherently combine the training symbols.

Dolle et al. show a method wherein the result of comparing the calculated phase difference to a threshold is used to selectively change the polarity one or more received training symbols comprising the recognizing means of the communication device that includes the means for detecting the phase of the auto-correlation result of the training sequence (symbols). Dolle et al. further show the recognizing means can further comprise means for comparing the detected phase (calculated phase difference) with a predetermined phase threshold to recognize the type of the received data burst (Col. 4, lines 41-47). Further, the recognizing means advantageously comprises means for detecting the sign value of the real part of the auto-correlation result of the training sequence. Thus, inverting the symbols (changing the polarity) of the second training sequence (containing plurality of symbols) in this way is done, that is by using the auto- correlation result, and further a (new) different phase behavior (phase difference) for the first and second training sequence (symbols) can be obtained in the auto-correlation procedure performed in the recognizing means 7, so that first and second training sequences and therefore first

type and second type data bursts can be distinguished from each other (Col. 7, lines 10-16). Therefore, it would have been obvious to one of ordinary skilled in the art at the time of invention to modify the method of Gardner et al. to be able to provide proper synchronization between the receiver and transmitter.

Arima et al. show a method wherein the calculated phase difference used to coherently combine the training symbols comprising calculating an in-phase addition value for every plural pilot symbols (training symbols) by in-phase addition of pilot signals (phase information/phase difference is used to add plurality of pilot/training symbols), and performing weighted addition using individually the amplitude components and phase components of the calculated in-phase addition values. Further, the amplitude components and phase components of respective channel estimates are calculated (channel is estimated) using this added pilot/training symbols (Page 2, paragraph 0022; Figs. 1, 2, 6, and 7). Further, Arima et al. show the plurality of pilot symbols in pilot block 11 that are in-phase-added (according to their phase information) and the channel estimate of the nth pilot block is calculated (Page 1, paragraph 0004). Therefore, it would have been obvious to on of ordinary skilled

in the art at the time of invention to modify the method of Gardner et al. and Dolle et al. to better estimate the channel conditions and efficiently utilize network resources by effectively assigning the network resources to the channel based on the channel conditions.

Allowable Subject Matter

6. Claims 1-2, 4-6, 21, and 25 are allowed.

7. Claim 13 would be allowable if rewritten to include all of the limitations of the base claim and any intervening claims.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Walton, Jr. et al. disclose power control in a CDMA network. He et al. disclose a channel estimator and equalizer for OFDM systems.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shick C.

Hom whose telephone number is 571-272-3173. The examiner can normally be reached on Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pham Chi can be reached on 571-272-3179. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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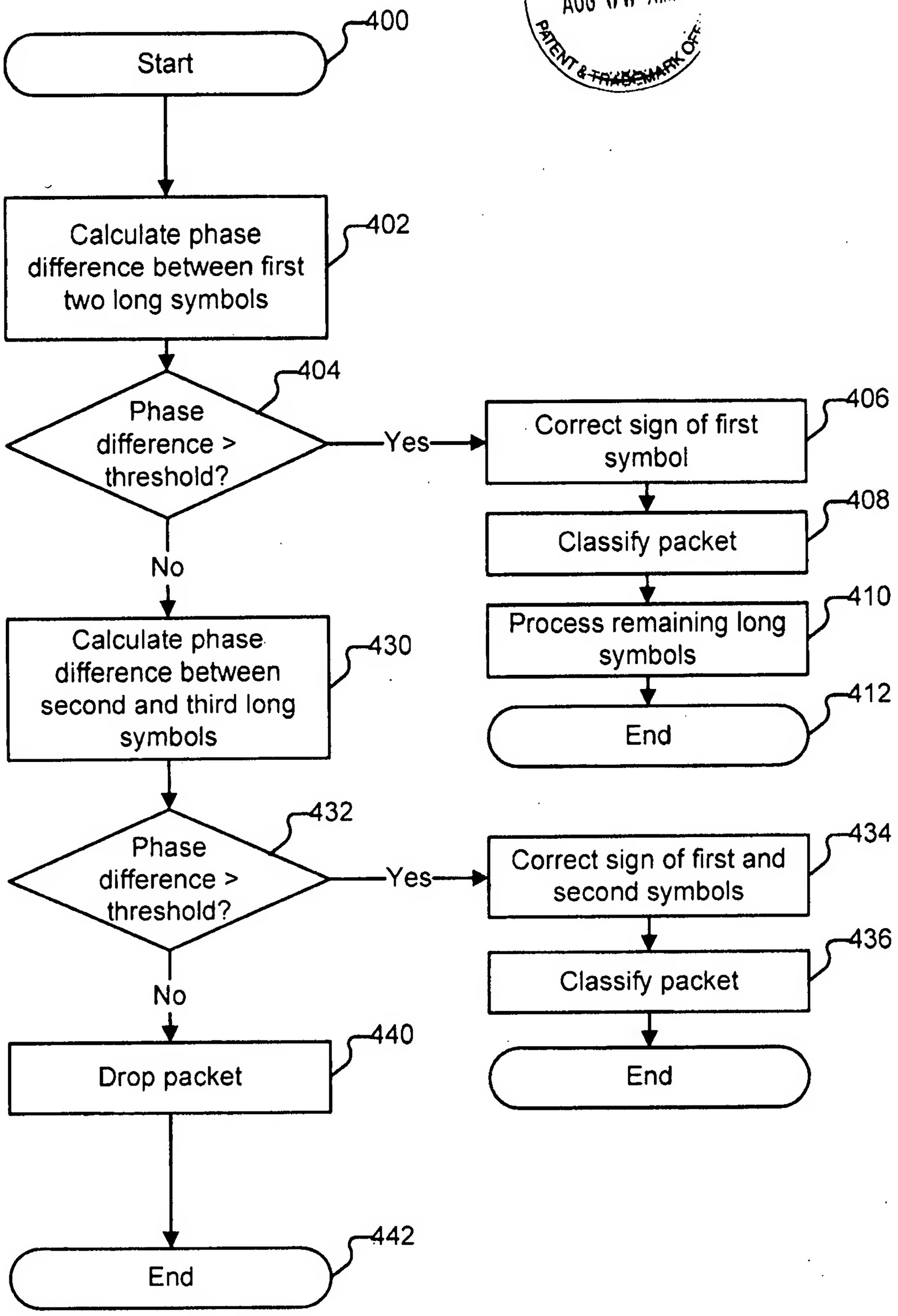

FIG. 4